

FIG. 1

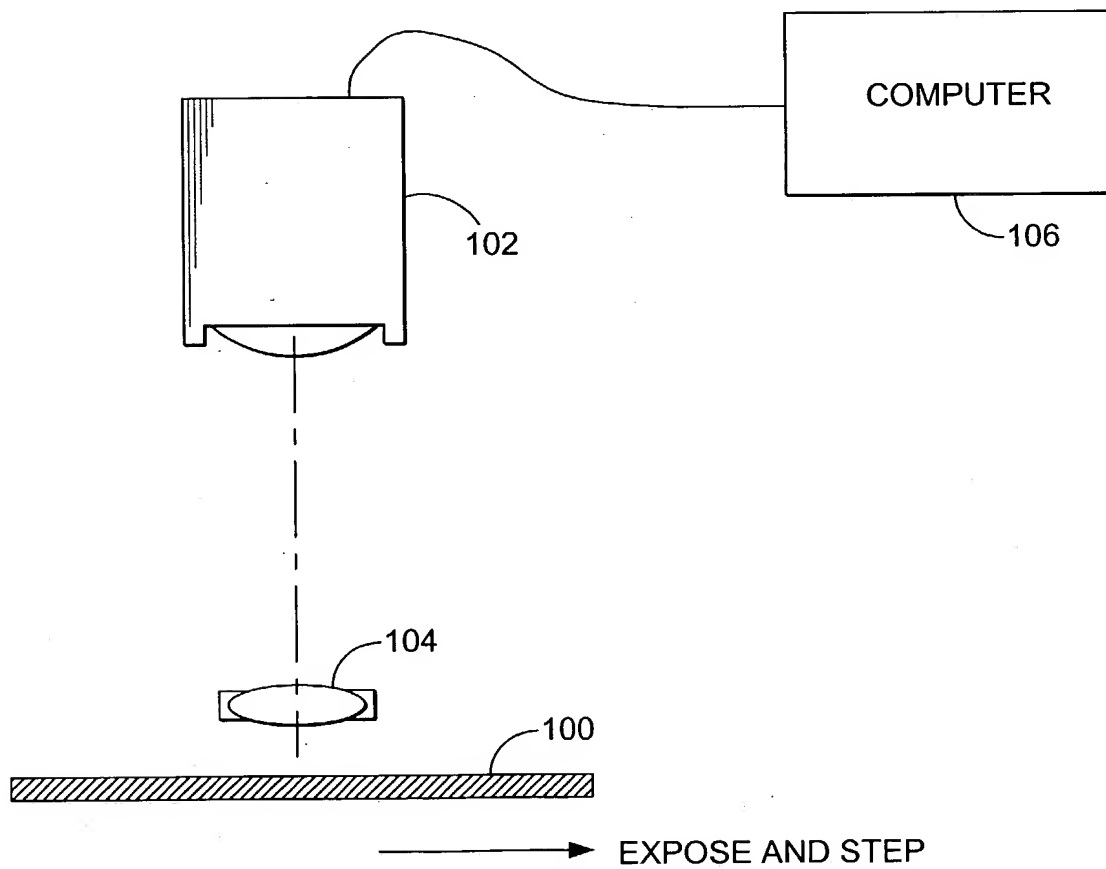


FIG. 4

FIG. 2

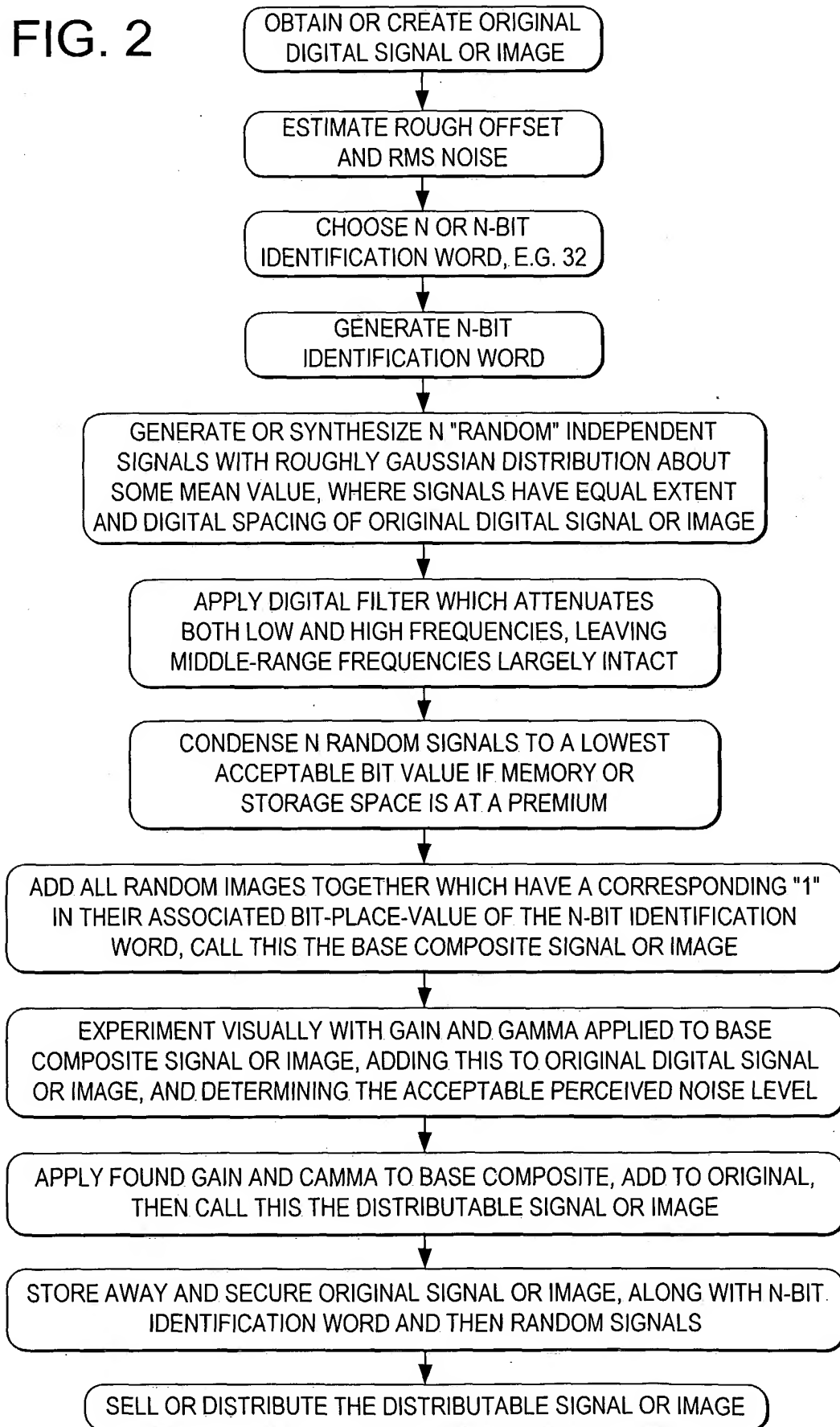
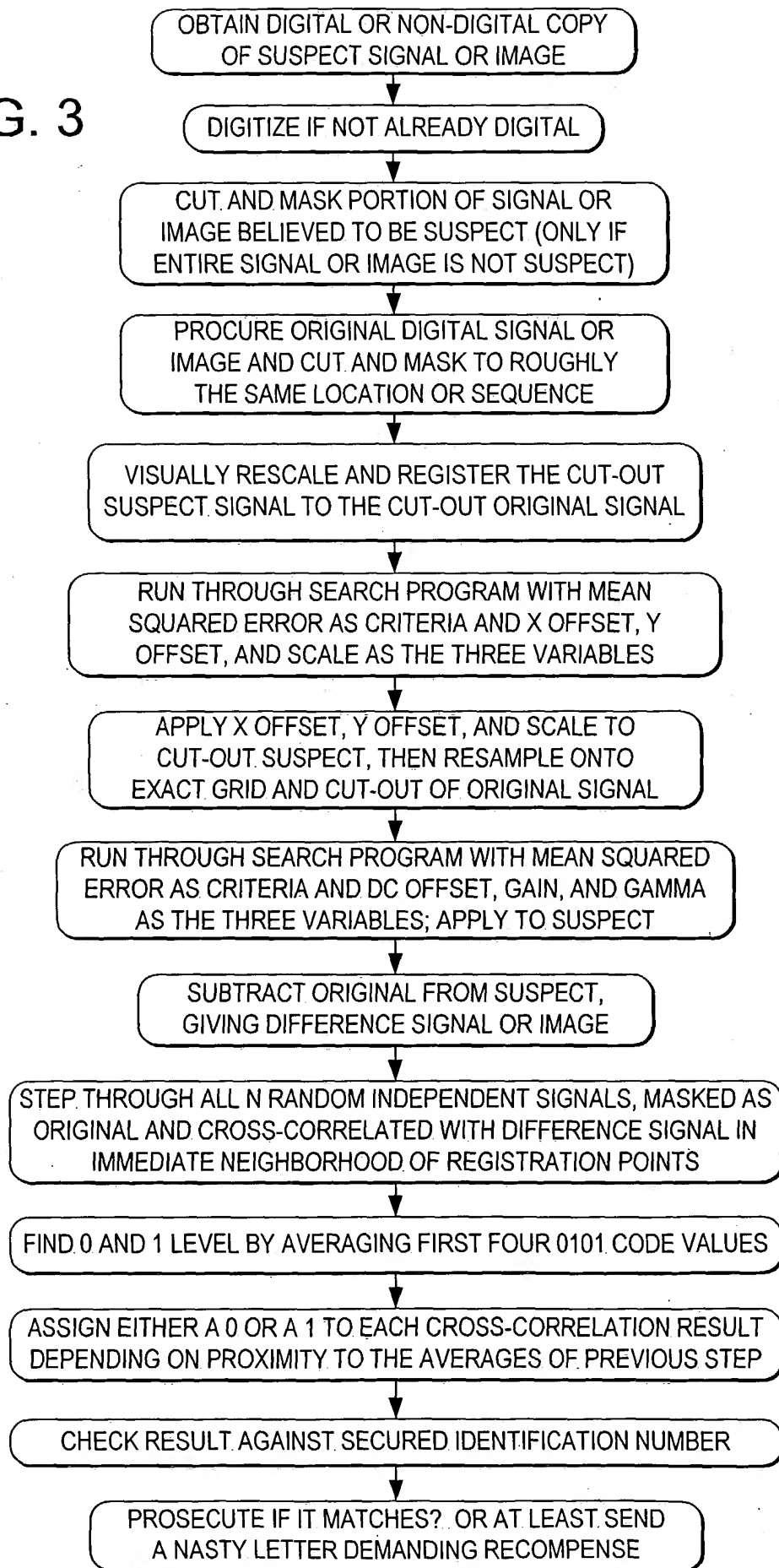


FIG. 3



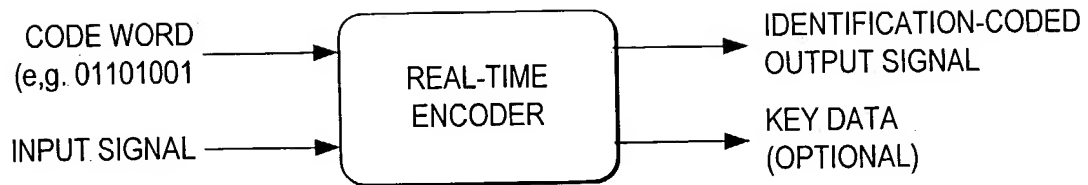


FIG. 5

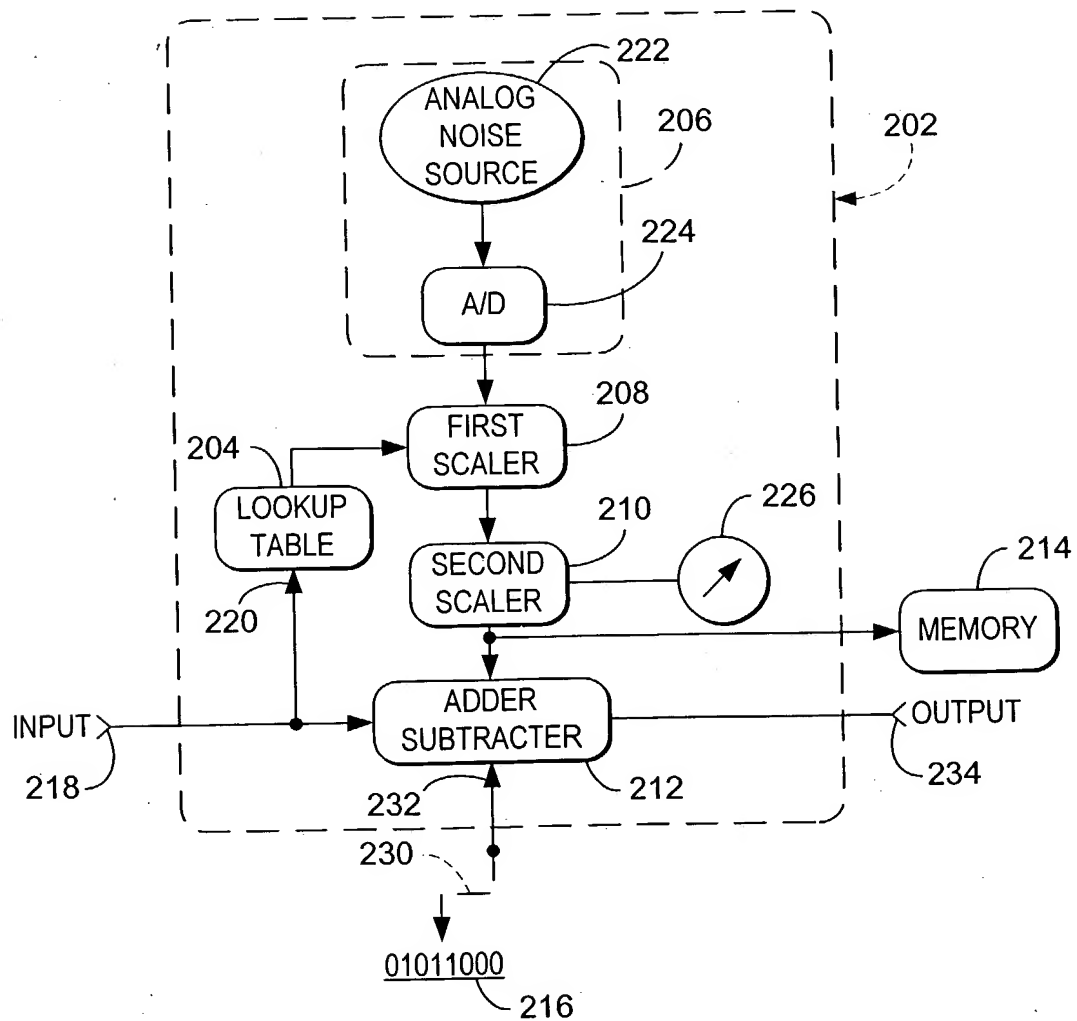


FIG. 6

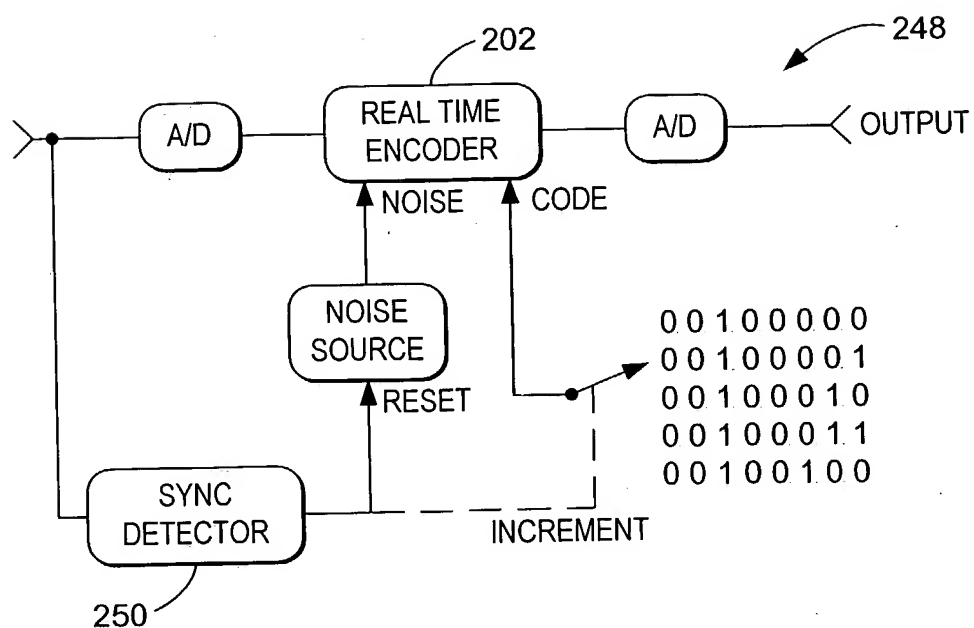
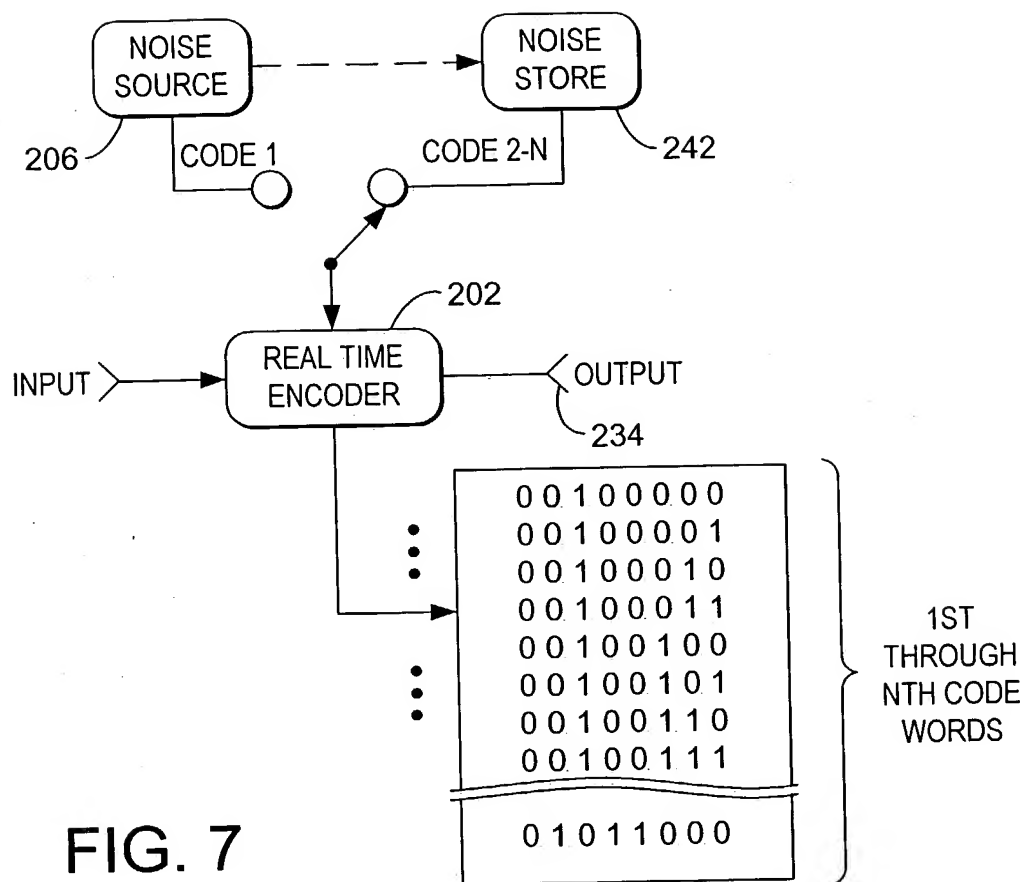


FIG. 8

FIG. 9A

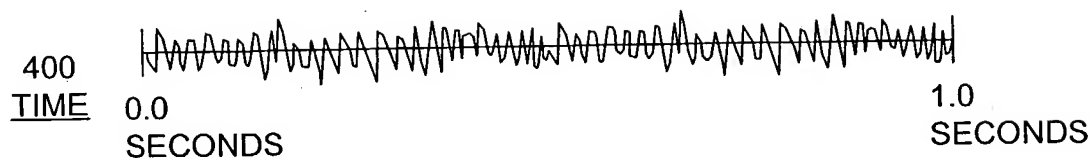


FIG. 9B

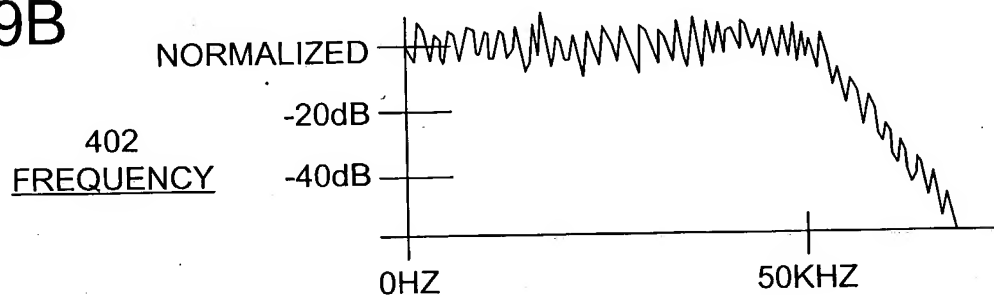


FIG. 9C

BORDER
CONTINUITY
404

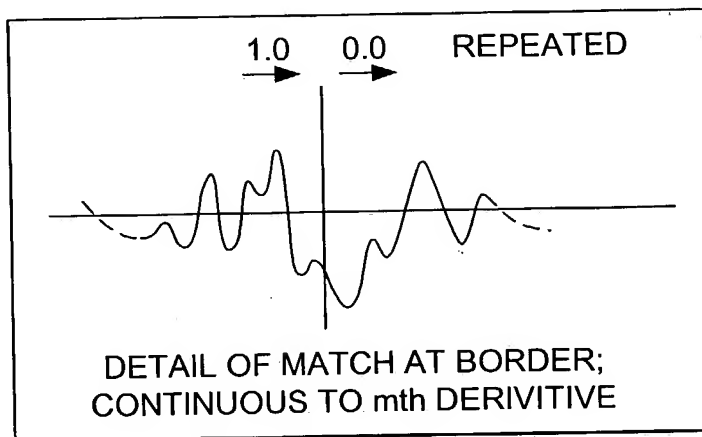


FIG. 10

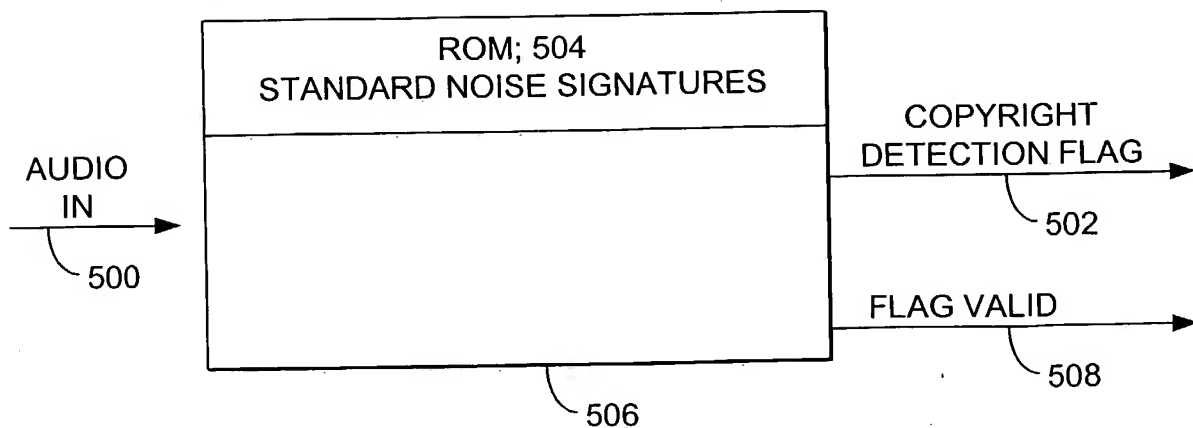


FIG. 11

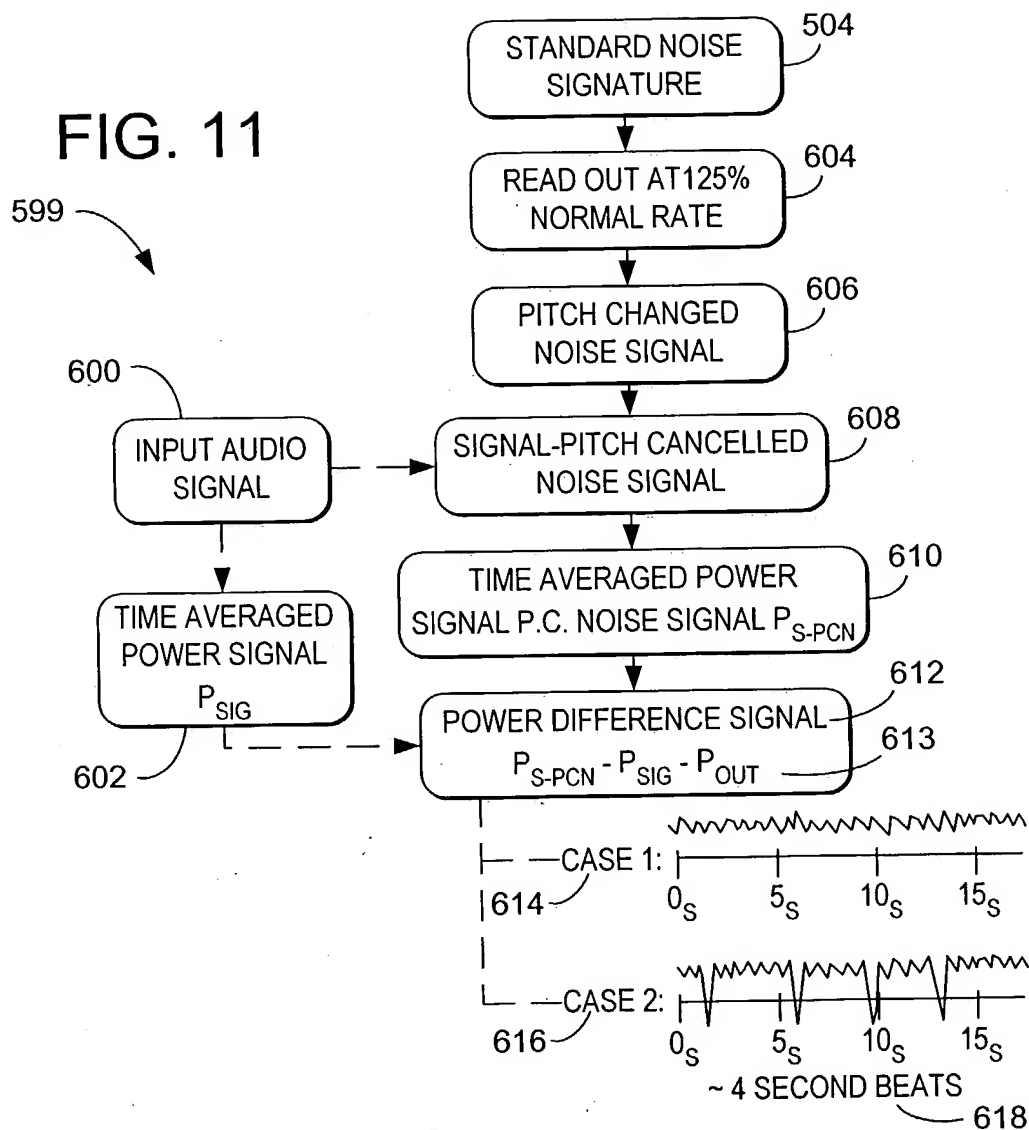
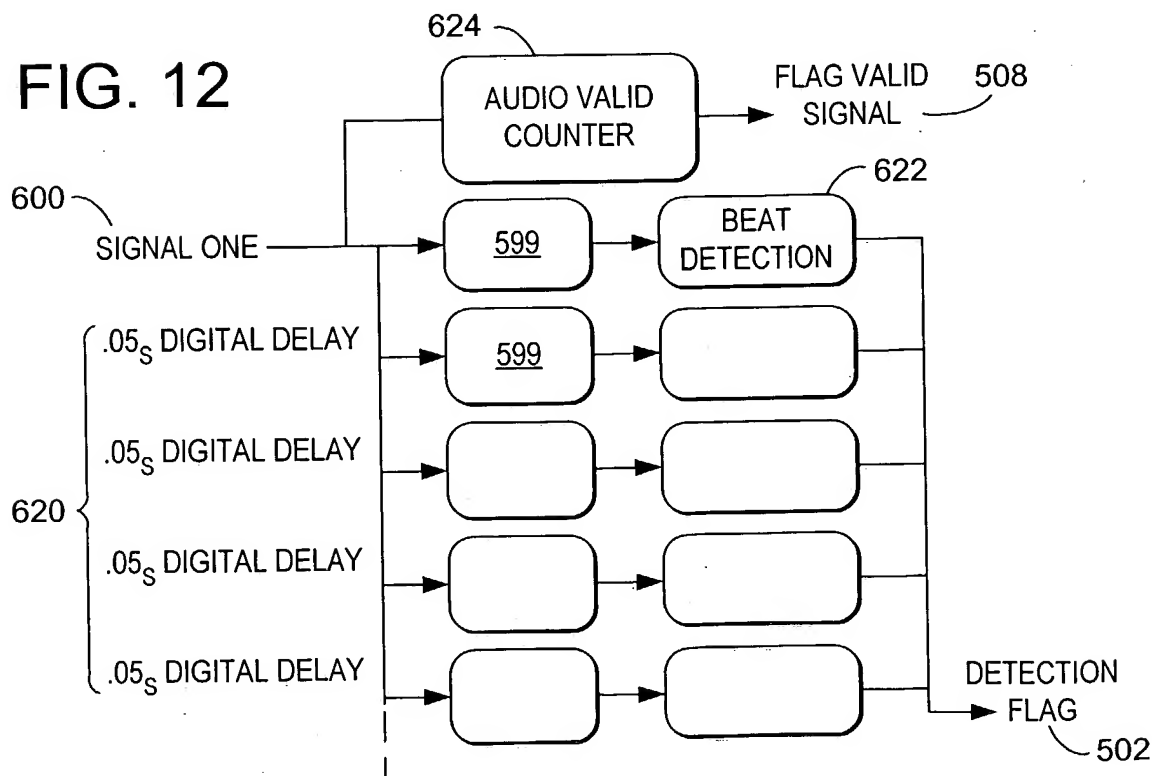
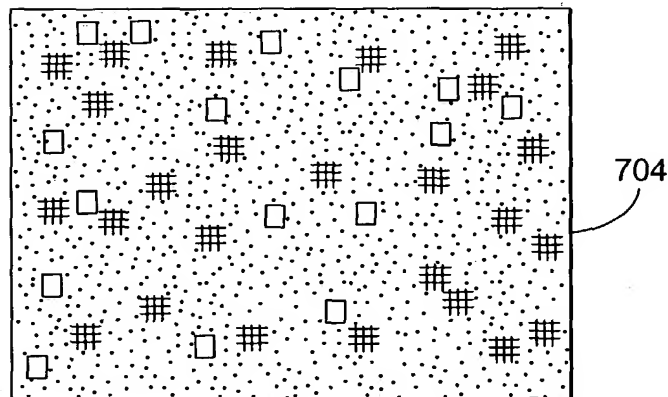
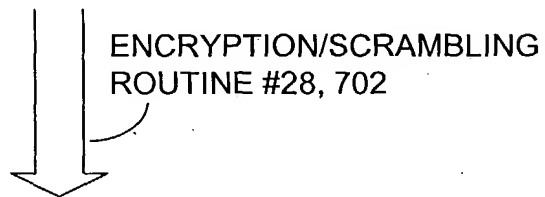
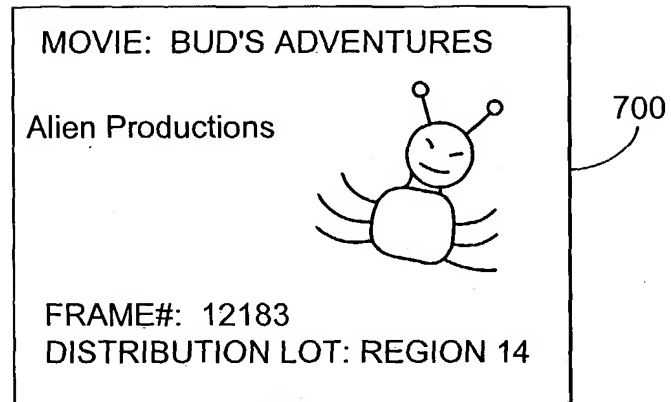


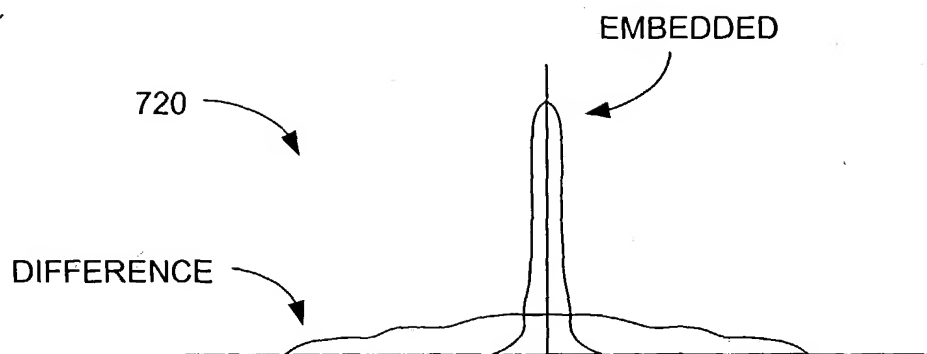
FIG. 12



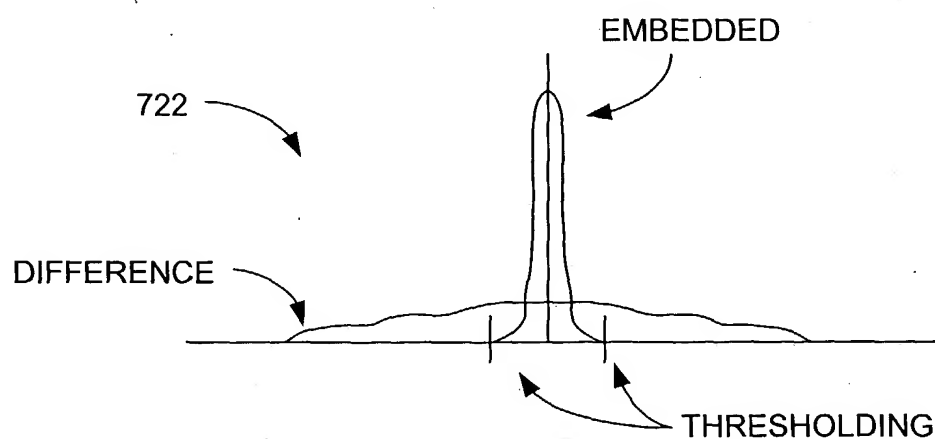


PSEUDO-RANDOM MASTER SNOWY IMAGE
(SCALED DOWN AND ADDED TO FRAME 12183)

FIG. 13



MEAN-REMOVED HISTOGRAMS OF DIFFERENCE
SIGNAL AND KNOWN EMBEDDED CODE SIGNAL



MEAN-REMOVED HISTOGRAMS OF FIRST
DERIVATIVES (OR SCALAR GRADIENTS IN CASE OF AN
IMAGE)

FIG. 14

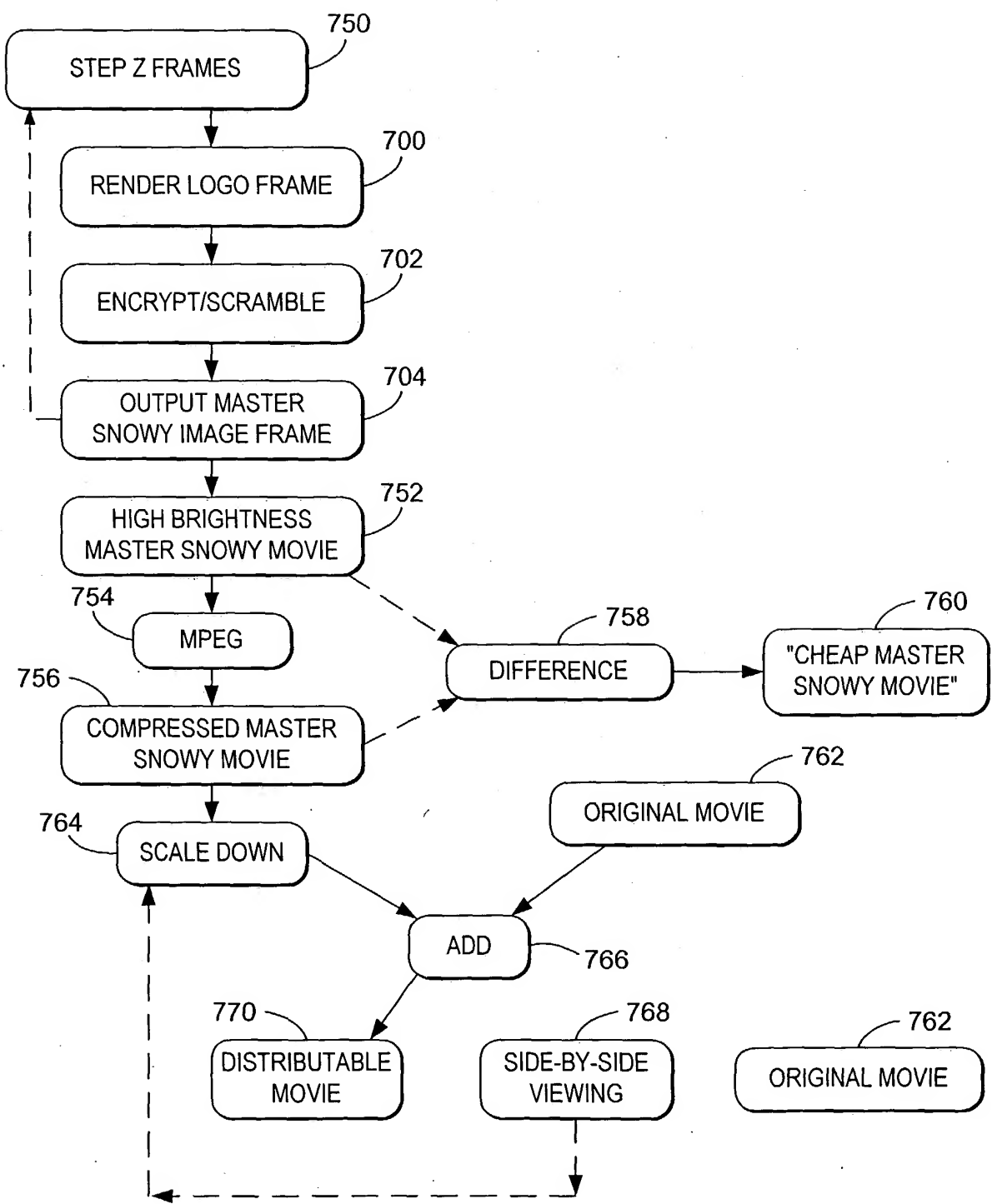


FIG. 15

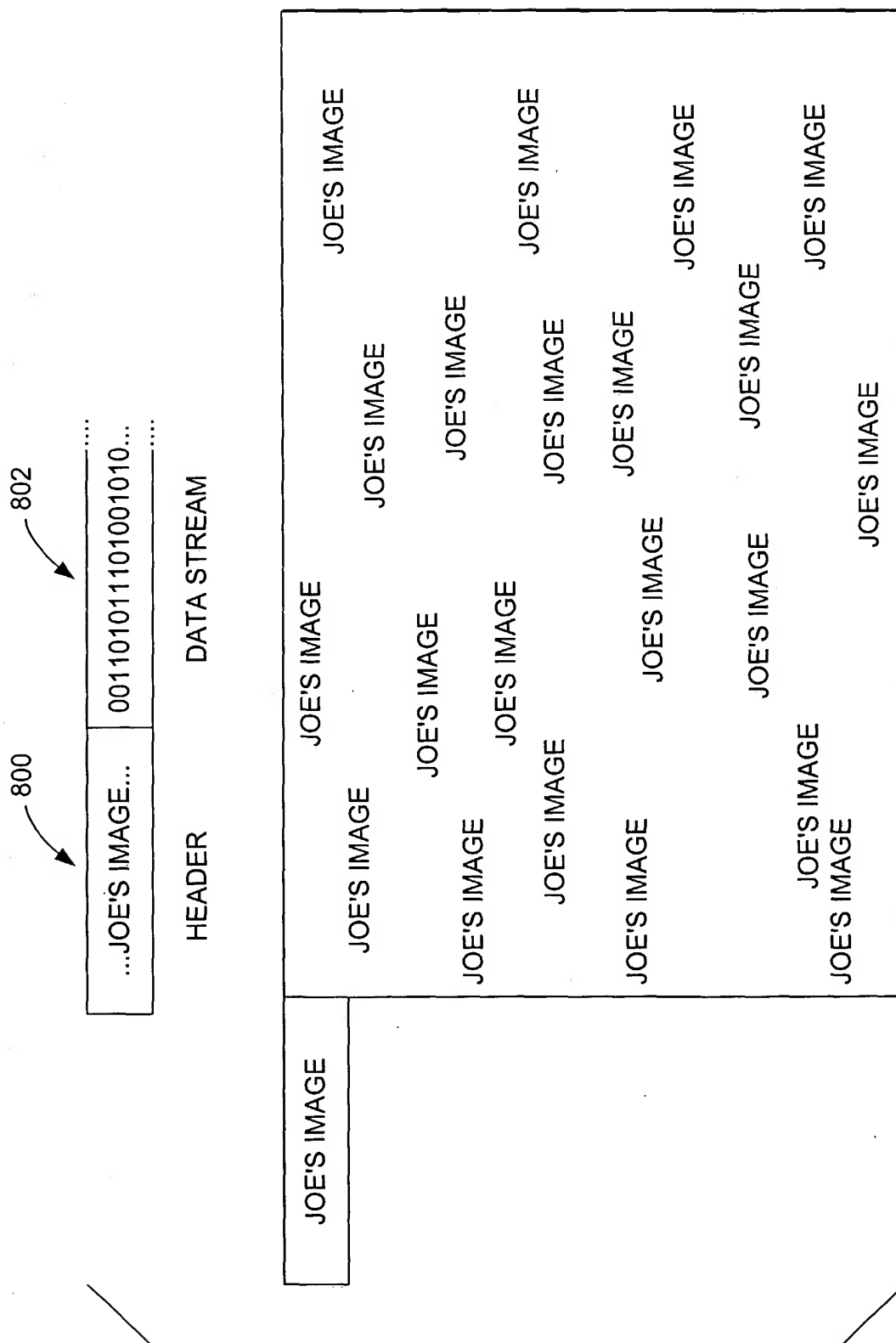
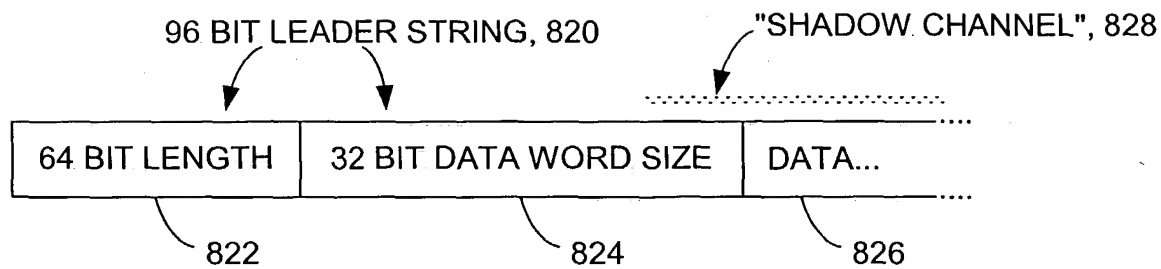


FIG. 16



UNIVERSAL EMPIRICAL DATA FORMAT

FIG. 17

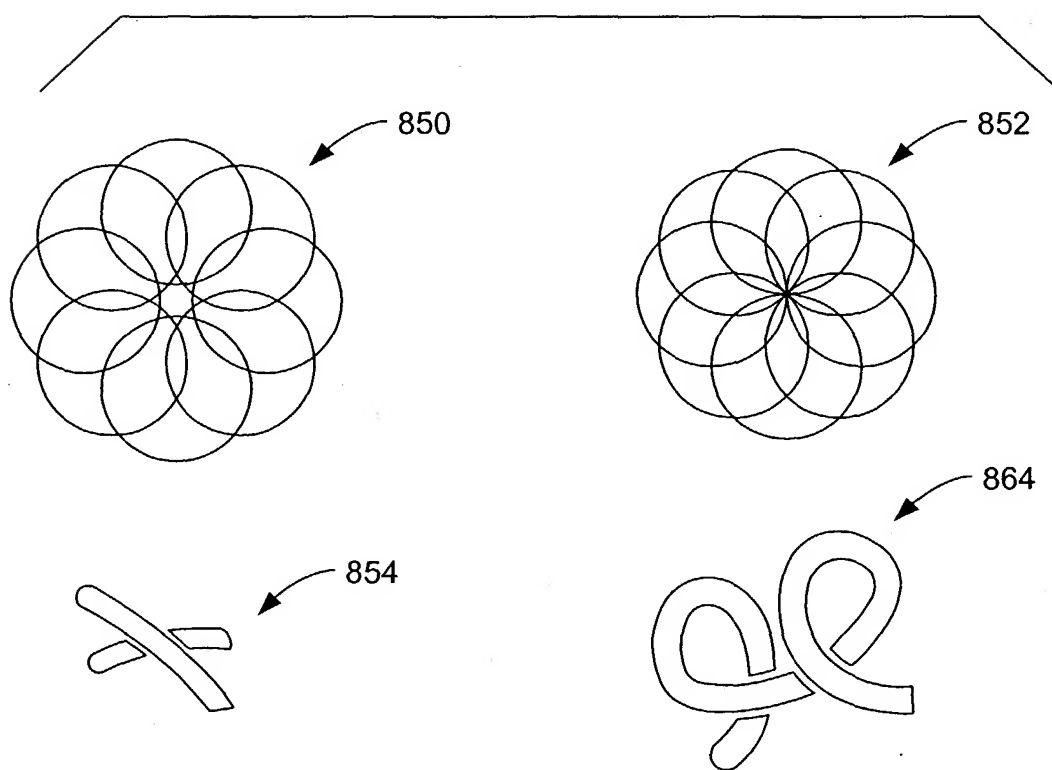
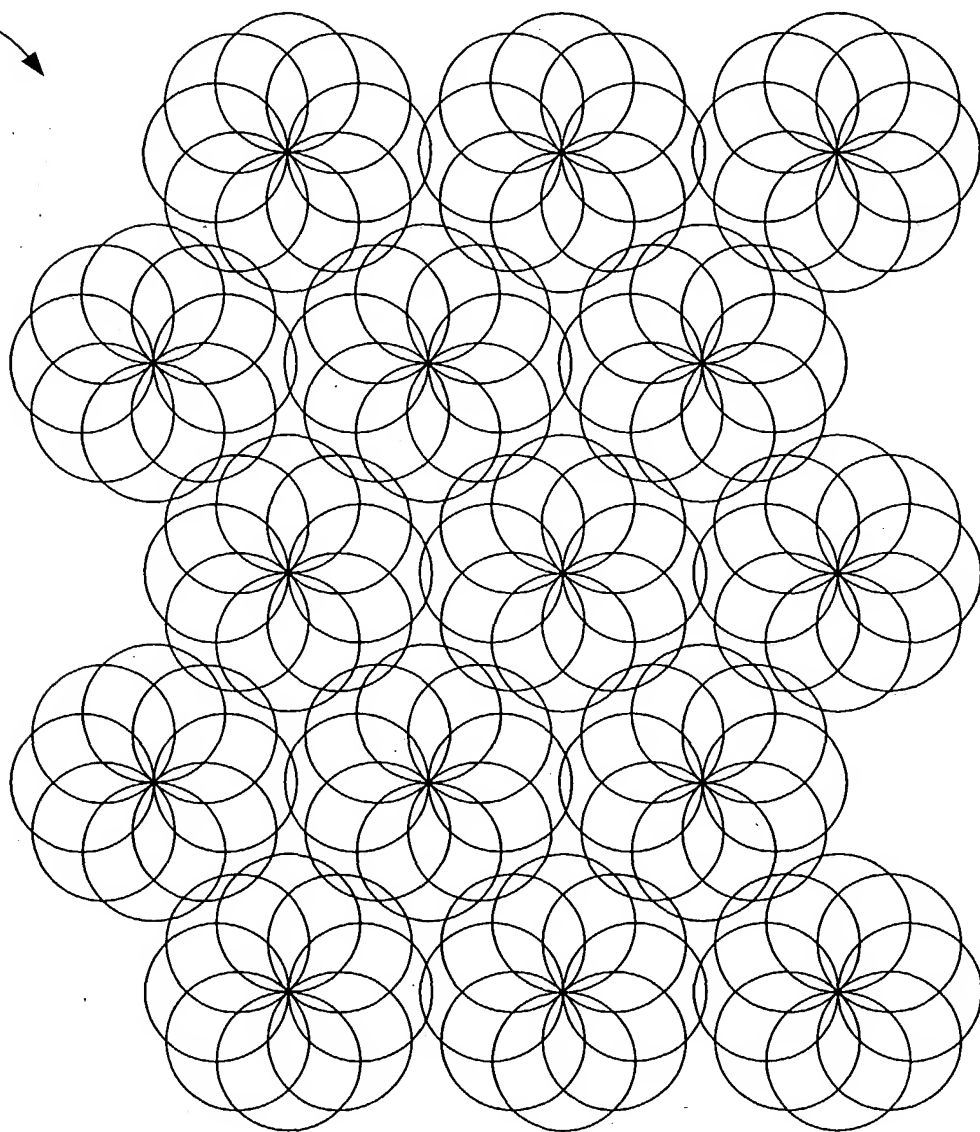


FIG. 18

866



QUEST FOR MOSAICED KNOT PATTERNS WHICH "COVER" AND
ARE COEXTENSIVE WITH ORIGINAL IMAGE; ALL ELEMENTAL
KNOT PATTERNS CAN CONVEY THE SAME INFORMATION, SUCH
AS A SIGNATURE, OR EACH CAN CONVEY A NEW MESSAGE IN A
STEGANOGRAPHIC SENSE

FIG. 19

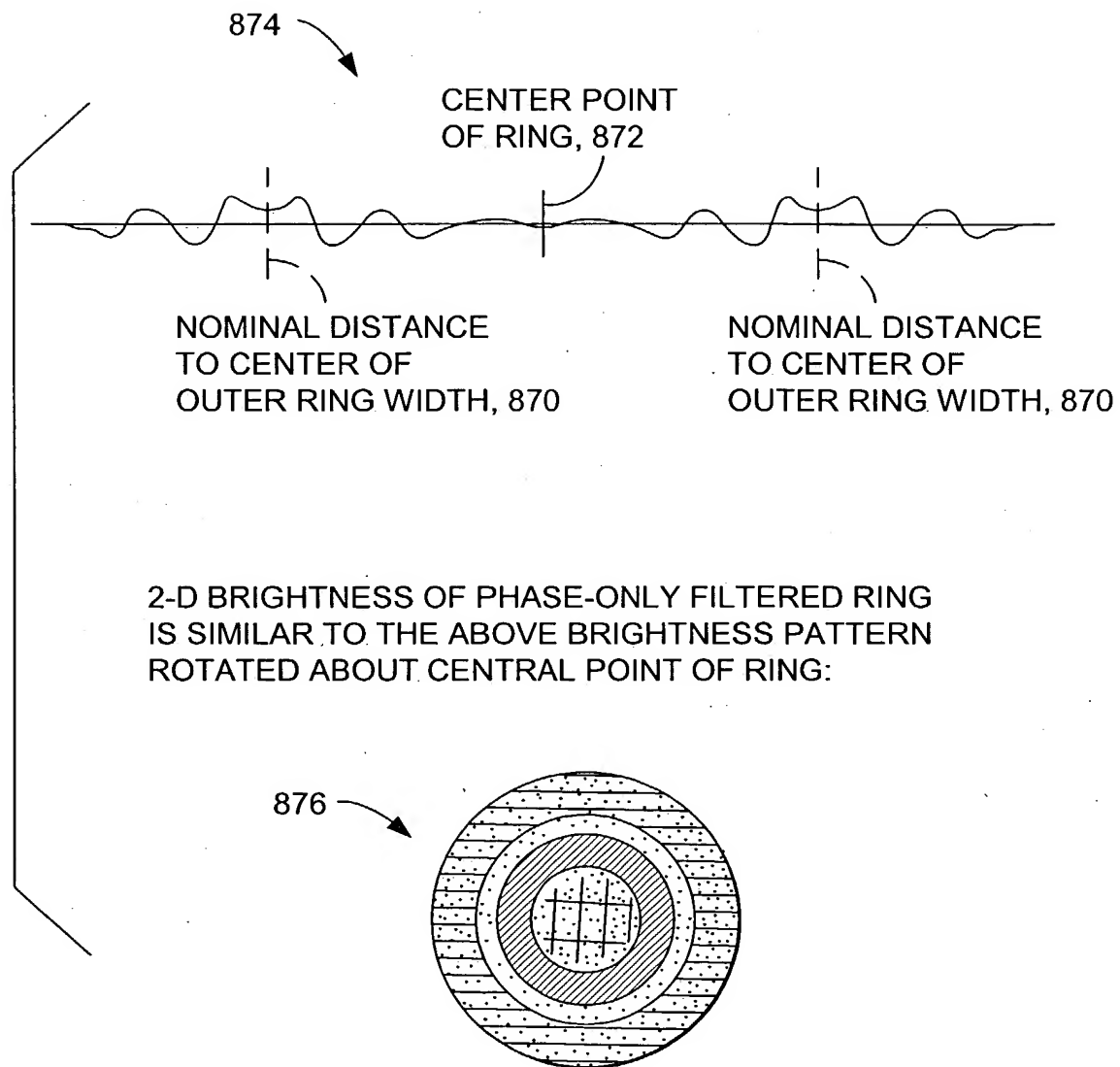
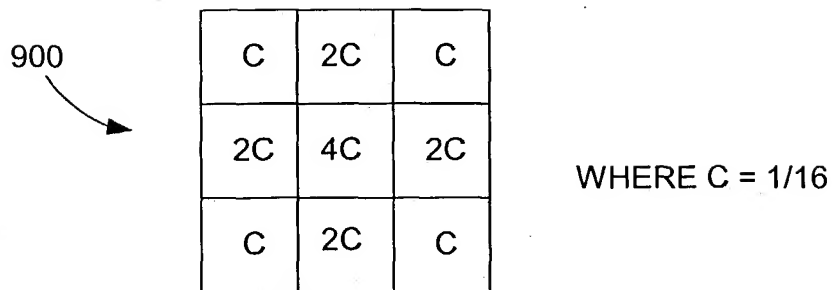
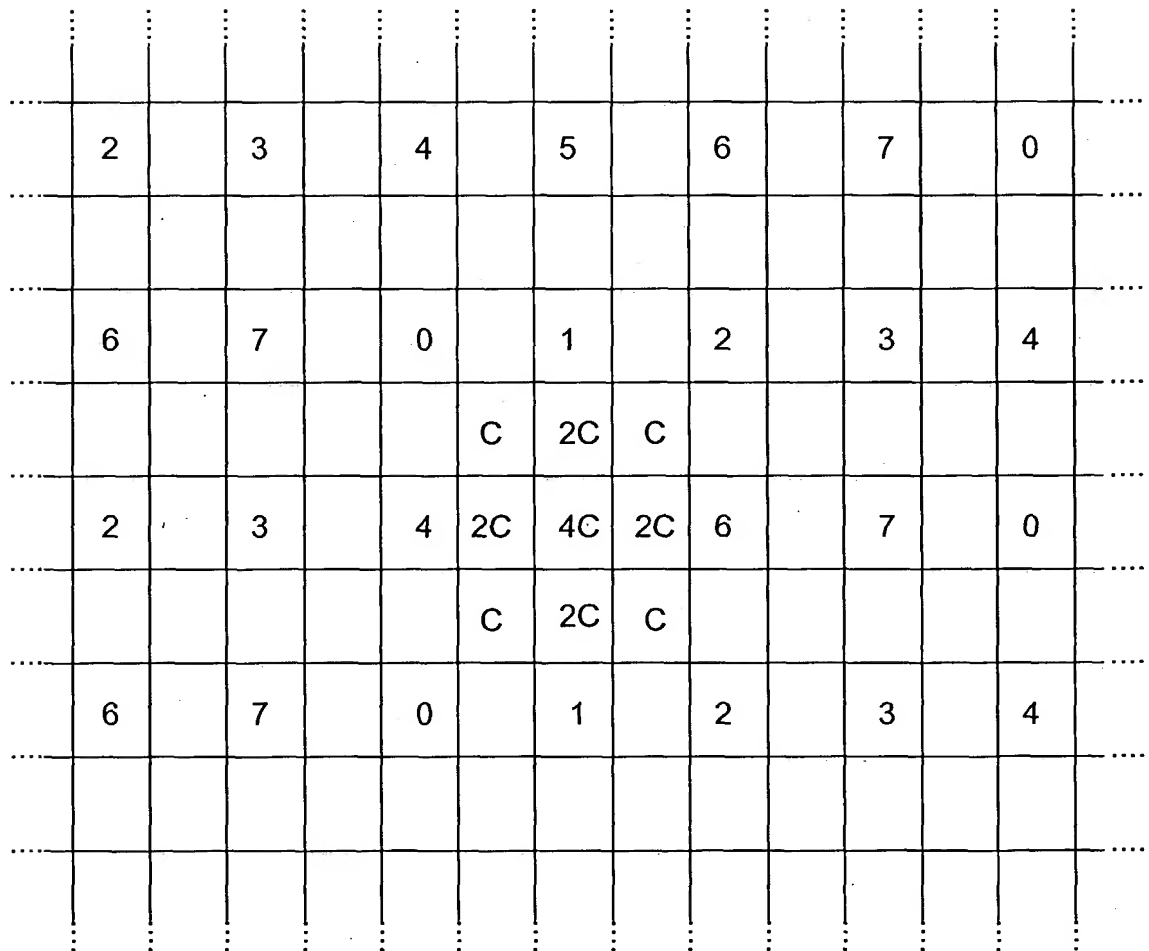


FIG. 20



ELEMENTARY BUMP (DEFINED
GROUPING OF PIXELS WITH
WEIGHT VALUES)

FIG. 21A



EXAMPLE OF HOW MANY ELEMENTARY BUMPS, 900, WOULD BE ASSIGNED LOCATIONS IN AN IMAGE, AND THOSE LOCATIONS WOULD BE ASSOCIATED WITH A CORRESPONDING BIT PLANE IN THE N-BIT WORD, HERE TAKEN AS $N=8$ WITH INDEXES OF 0-7. ONE LOCATION, ASSOCIATED WITH BIT PLANE "5", HAS THE OVERLAY OF THE BUMP PROFILE DEPICTED.

FIG. 21B

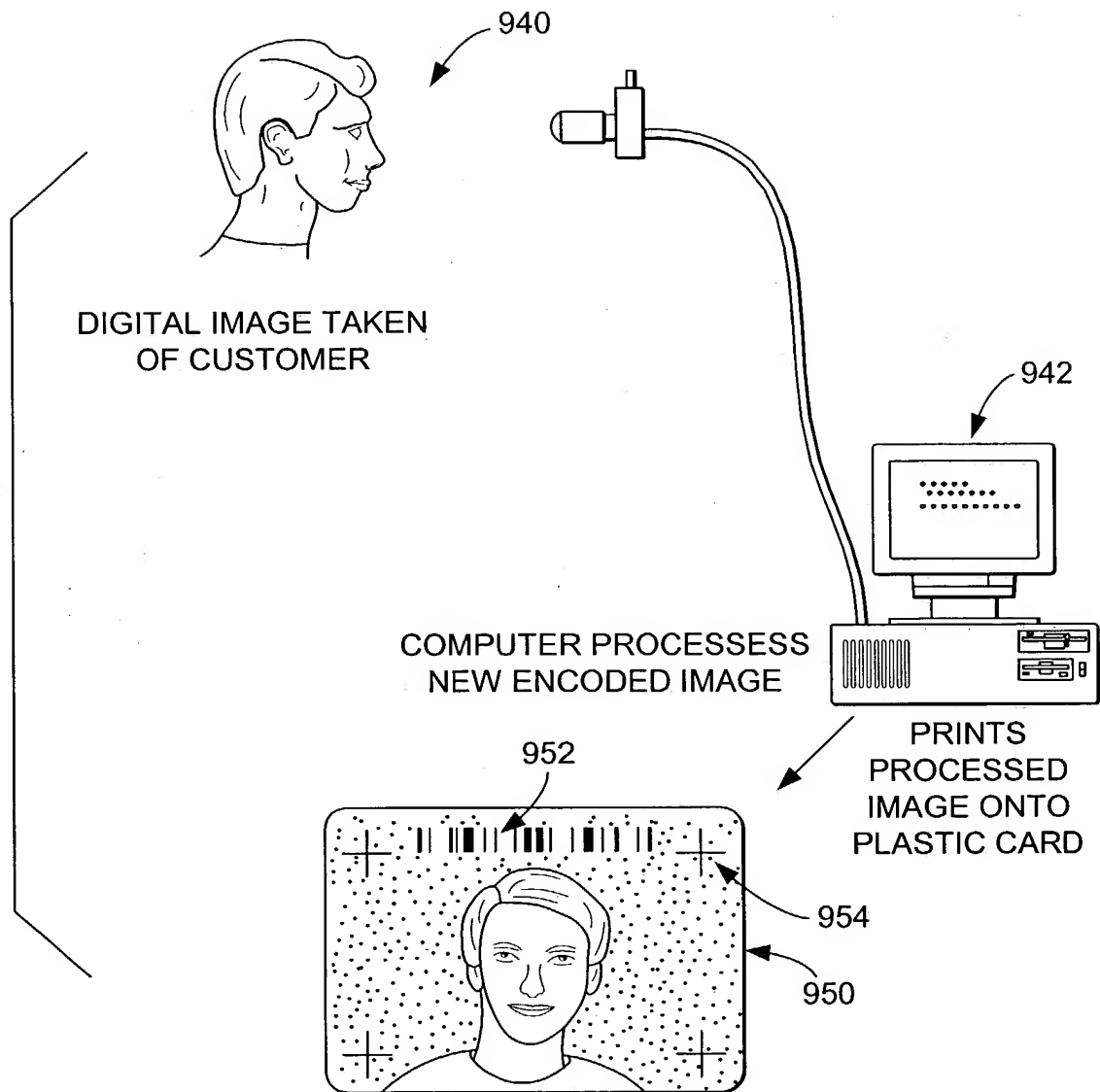
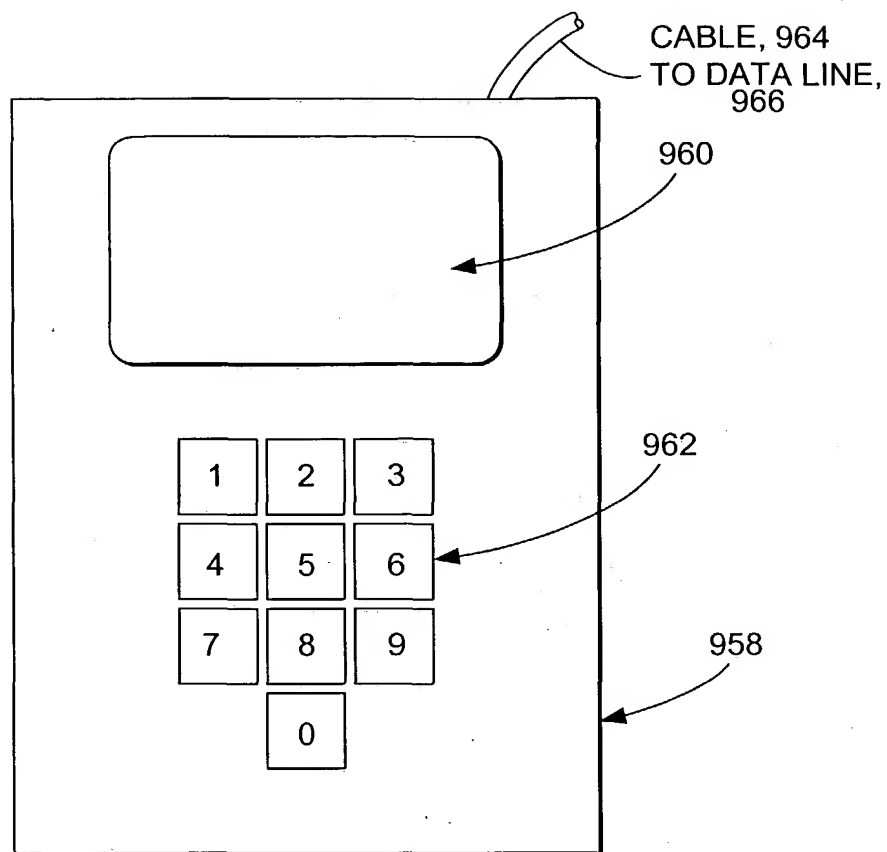


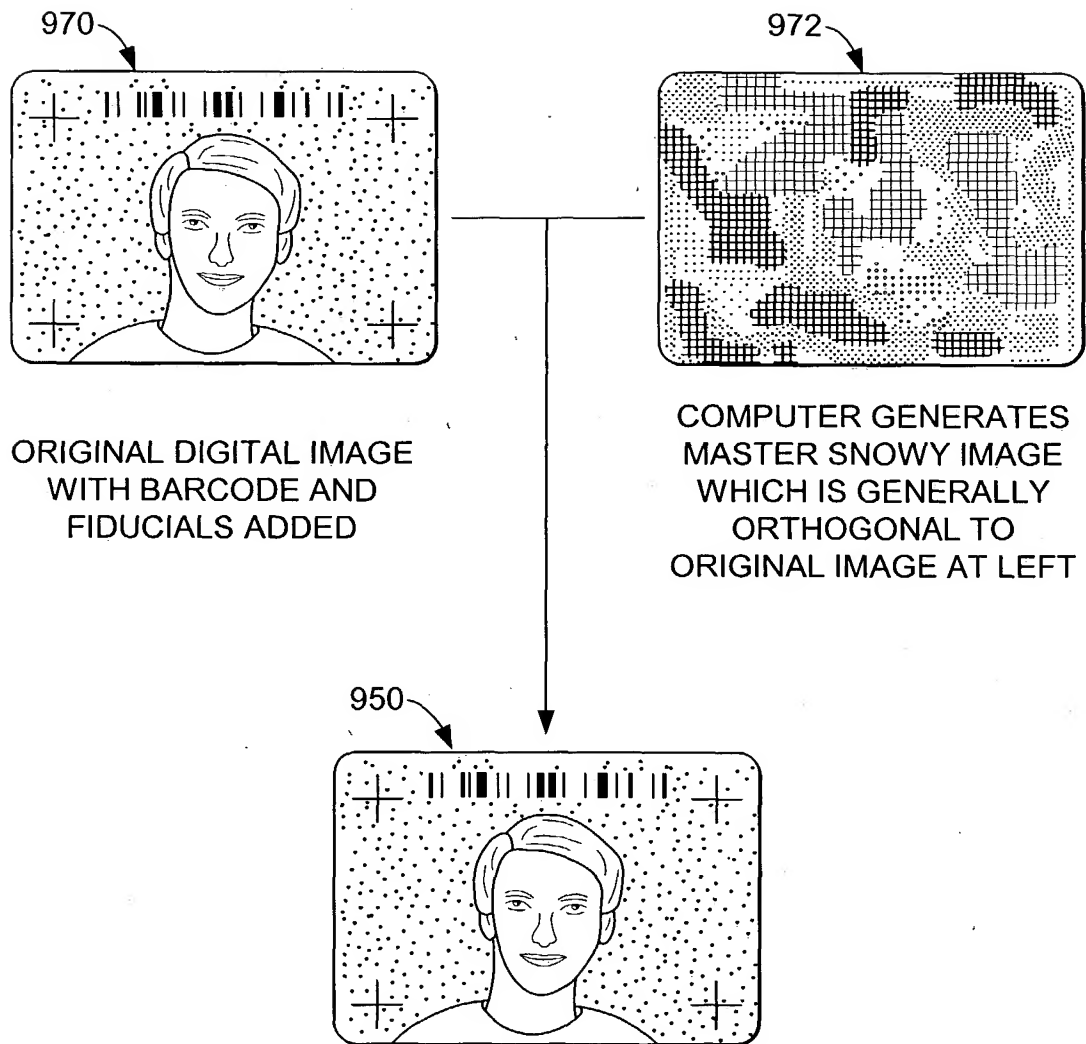
FIG. 22



CONTAINS RUDIMENTARY OPTICAL SCANNER,
MEMORY BUFFERS, COMMUNICATIONS DEVICES,
AND MICROPROCESSOR

CONSUMER MERELY PLACES CARD INTO WINDOW
AND CAN, AT THEIR PREARRANGED OPTION, EITHER
TYPE IN A PERSONAL IDENTIFICATION NUMBER (PIN,
FOR ADDED SECURITY) OR NOT. THE TRANSACTION
IS APPROVED OR DISAPPROVED WITHIN SECONDS.

FIG. 23



COMBINED TO FORM PERSONAL CASH CARD

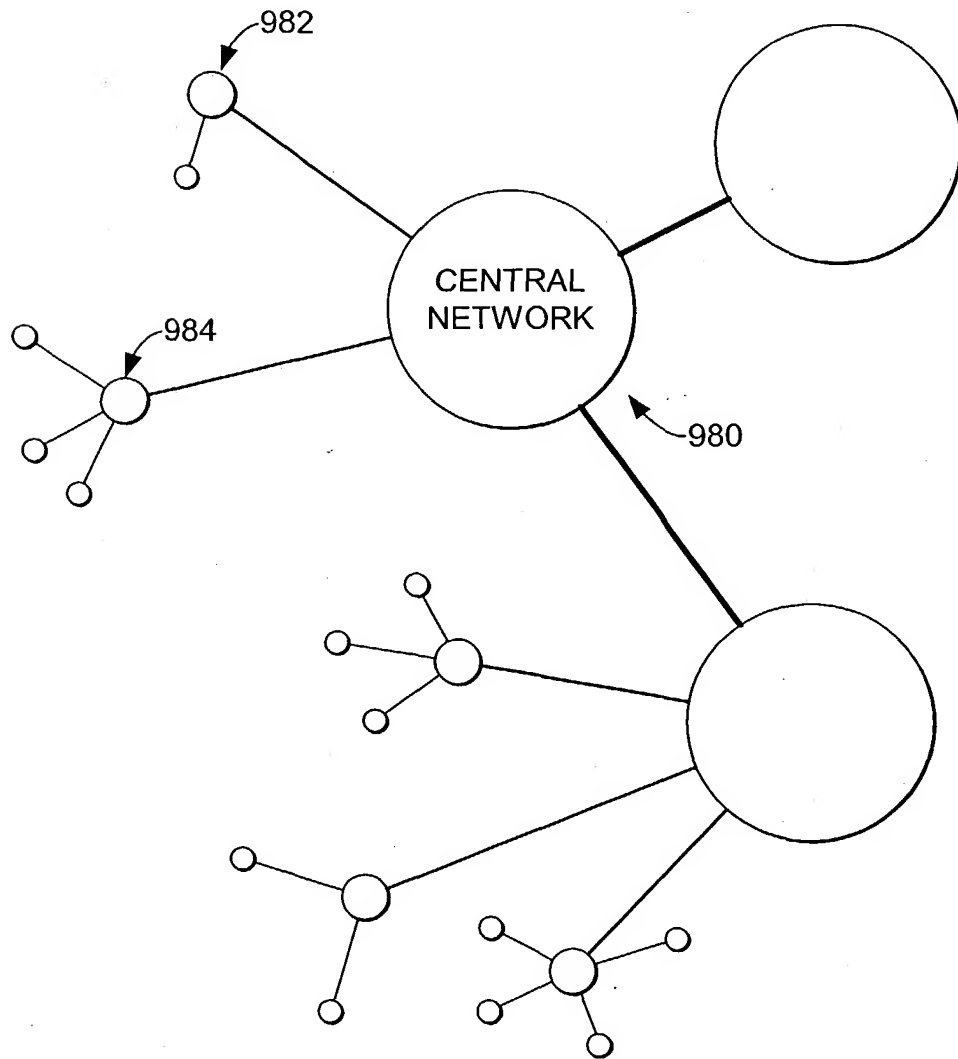
FIG. 24

TYPICAL TRANSACTION STEPS

1. READER SCANS IMAGE ON CARD, STORES IN MEMORY, EXTRACTS PERSON'S ID
2. OPTIONAL: USER KEYS IN PIN NUMBER
 3. READER CALLS CENTRAL ACCOUNT DATA NETWORK, HANDSHAKES
 4. READER SENDS ID, (PIN), MERCHANT INFORMATION, AND REQUESTED TRANSACTION AMOUNT TO CENTRAL NETWORK
 5. CENTRAL NETWORK VERIFIES ID, PIN, MERCHANT INFO, AND ACCOUNT BALANCE
 6. IF OK, CENTRAL NETWORK GENERATES TWENTY-FOUR SETS OF SIXTEEN DISTINCT RANDOM NUMBERS, WHERE THE RANDOM NUMBERS ARE INDEXES TO A SET OF 64K ORTHOGONAL SPATIAL PATTERNS
7. CENTRAL NETWORK TRANSMITS FIRST OK, AND THE SETS OF RANDOM NUMBERS
8. READER STEPS THROUGH THE TWENTY-FOUR SETS
 - 8A. READER ADDS TOGETHER SET OF ORTHOGONAL PATTERNS
 - 8B. READER PERFORMS DOT PRODUCT OF RESULTANT PATTERN AND CARD SCAN, STORES RESULT
9. READER TRANSMITS THE TWENTY-FOUR DOT PRODUCT RESULTS TO CENTRAL NETWORK
 10. CENTRAL NETWORK CHECKS RESULTS AGAINST MASTER
11. CENTRAL NETWORK SENDS FINAL APPROVAL OR DENIAL
12. CENTRAL NETWORK DEBITS MERCHANT ACCOUNT, CREDITS CARD ACCOUNT

FIG. 25

THE NEGLIGIBLE-FRAUD CASH CARD SYSTEM



A BASIC FOUNDATION OF THE CASH CARD SYSTEM IS A 24-HOUR INFORMATION NETWORK, WHERE BOTH THE STATIONS WHICH CREATE THE PPHYSICAL CASH CARDS, 950, AND THE POINT-OF-SALES, 984, ARE ALL HOOKED UP TO THE SAME NETWORK CONTINUOUSLY

FIG. 26

